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USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK VOLUME 152

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C-12A IN-FLIGHT CREW NOISE(U) AIR FORCE AEROSPACE

MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB. H K HILLE

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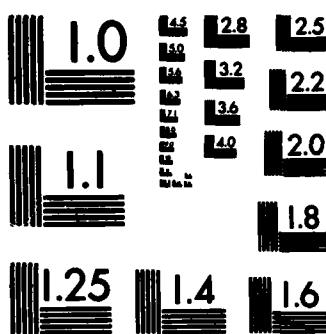
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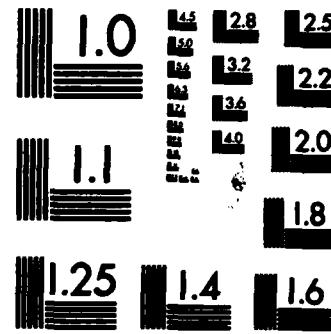
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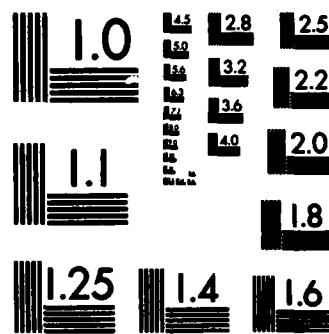
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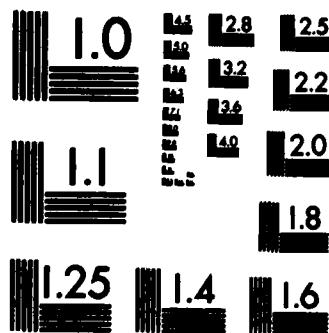
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USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK

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C-12A IN-FLIGHT CREW NOISE

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AIR FORCE AEROSPACE MEDICAL RESEARCH LABORATORY
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This report has been reviewed by the Office of Public Affairs (PA) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

FOR THE COMMANDER



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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The C-12A is a military version of the Beechcraft Super King Air 200. This report provides measured data defining the bioacoustic environments at flight crew/passenger locations inside this aircraft during normal flight operations. Data are reported for five locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, —			

perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, "USAF Bioenvironmental Noise Data Handbook, Vol. 1: Organization, Content and Application," AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.

PREFACE

This report was prepared by the Biodynamic Environment Branch, Air Force Aerospace Medical Research Laboratory, under Project/Task 723109, Communication and Performance Capability and Operational Noises. The author acknowledges the efforts of Mr. John Cole who established the data analysis requirements, Mr. Henry Mohlman, and Mr. Fred Lampley of the University of Dayton who assisted in the mechanics of data processing and Mrs. Norma Peachey who typed this report and prepared it for publication.

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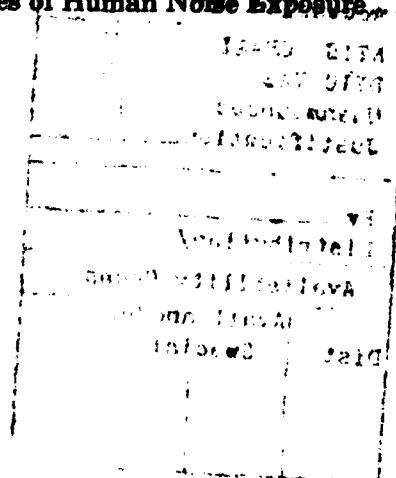


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INTRODUCTION

The C-12A is a military version of the Beechcraft Super King Air 200 and is used for operational support airlift. This aircraft is manufactured by the Beech Aircraft Corporation and is powered by two PT6A-38 turboprop engines each rated at 750 shp. The engines are manufactured by the Pratt & Whitney Aircraft Division of Canada.

This volume provides measured and extrapolated data defining bioacoustic environments produced inside the aircraft. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with operations of the C-12A aircraft.

This volume is one of a series published by the Air Force Aerospace Medical Research Laboratory (AFAMRL) under the same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise environments produced at flight/ground crew locations and in surrounding communities by operations of Air Force aircraft and ground support equipment. The far-field, community-type, noise data in the handbook describe the noise produced during operations of aircraft, ground support equipment, and other ground-based equipment or facilities.

Volume 1 of this handbook discusses the objectives and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definition of quantities, symbols, equations, applications, limitations, etc. Refer to Volume 1 (reference 1) for such information because it is not repeated in other handbook volumes.

A cumulative index lists those aerospace systems contained in the handbook, and identifies the specific volumes containing each type of environmental noise data available (i.e., inflight/flight crew and passenger noise, near-field ground crew noise, far-field/community noise). Volume numbers are assigned sequentially as individual volumes are published.

1. Cole, John N., USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application, AMRL-TR-75-50(1), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.

IN-FLIGHT NOISE

MEASUREMENTS

All noise measurements were made on-board a standard-configured C-12A aircraft during typical speed, altitude, and flight maneuver conditions. These levels describe the standard C-12A environments, but may not be representative of those levels encountered if the aircraft has been configured differently (e.g., major equipment or structural changes).

Acoustic measurements were made at various flight crew and passenger locations. Table 1 lists the measurement locations and test conditions as numeric/alphabetic designators which are used on the data pages. The designator 1/A means measurement location 1 and test condition A.

The microphone position was at ear level external to headgear in a region 0.2-0.3 meter from the head when an individual was present. At unoccupied locations, measurements were made at ear level throughout a volume where the head would normally be located. In both cases, the microphone was randomly moved throughout a spherical volume approximately 0.3 meter in diameter and the resultant samples analyzed using a 4- or 8- second integration time to obtain a power-averaged level, which effectively smooths out short-duration fluctuations and best describes the exposure.

Although the presence of a crew member or passenger at a measurement location affects the resultant sound field, the magnitude of such effects is generally small and not significant in determining exposure limits or voice communication capabilities. Consequently, no distinction is made in this report between occupied and unoccupied measurement locations.

RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced inside the C-12A aircraft at the five specific locations. This table includes the overall, 1/3 octave band, and octave band levels. From these data, C-weighted and A-weighted sound levels, maximum permissible time for one exposure per day (AFR 161-35 with and without standard Air Force ear protectors, preferred speech interference level, and perceived noise level are calculated and presented in Table 3. These measures are widely used to assess the effects of noise on personnel and their performance.

TABLE 1
MEASUREMENT LOCATIONS AND TEST CONDITIONS

C-12A, Andrews AFB, 8 June 1982

LOCATION	POSITION	HEIGHT ABOVE DECK
1	Pilot/Copilot	Seated Head Level
2	First Row Seats, Centerline	Seated Head Level
3	Second Row Seats, Centerline	Seated Head Level
4	Third Row Seats, Centerline	Seated Head Level
5	Aft Aircraft Storage Area	Seated Head Level
CONDITION	DESCRIPTION	
A	Engine Start, Both Engines Idle, Taxi	
B	High Speed, Ground, Idle 900 RPM	
C	Military Ground Runup 1800 RPM	
D	Takeoff/Roll	
E	Liftoff, Gear Up, Climb to 5000 ft., 2000 RPM	
F	Climb thru 5000 ft., 1900 RPM	
G	Climb thru 10000 ft.	
H	Cruise 24000 ft. - 1900 RPM, 170 KIAS	
I	Cruise 24000 ft. - 2000 RPM (High Speed)	
J	Cruise 24000 ft. - 1900 RPM	
K	Cruise 24000 ft. - 1800 RPM	
L	Cruise 24000 ft. - 1700 RPM	
M	Descending to 1500 ft. - 1900 RPM	
N	Cruise 15000 ft. - 2000 RPM	
O	Cruise 15000 ft. - 1900 RPM	
P	Cruise 15000 ft. - 1800 RPM	
Q	Cruise 15000 ft. - 1700 RPM	
R	Cruise 8000 ft. - 2000 RPM	
S	Cruise 8000 ft. - 1900 RPM	
T	Cruise 8000 ft. - 1800 RPM	
U	Cruise 8000 ft. - 1700 RPM	
V	Approach 1500 ft. - 1700 RPM	
W	Simulated Missed Approach	
X	Approach 1500 ft. - 2000 RPM, Gear Down	
Y	Landing Roll	

TABLE: MEASURED SOUND PRESSURE : FREQUENCY (DB)

2

FREQUENCY (HZ)	1/3	1/6	1/12	1/24	1/48	1/96	1/192	1/384	1/768	1/1536	1/3072	1/6144	1/12288	1/24576	1/49152	1/98304	1/196608	1/393216	1/786432	1/1572864	1/3145728	1/6291456	1/12582912	1/25165824	1/50331648	1/10066320	1/20132640	1/40265280	1/80530560	1/161061120	1/322122240	1/644244480	1/1288488960	1/2561677920	1/5123355840	1/10246711680	1/20481342320	1/40962684640	1/81925369280	1/163841073840	1/327682147680	1/65536429520	1/13107285040	1/26214417080	1/52428834160	1/104857668320	1/2097152136640	1/4194304273280	1/838860854560	1/167772109120	1/335544218240	1/671088436480	1/134217687280	1/268435374560	1/536870749120	1/107374149240	1/214748298480	1/429496596960	1/858993193920	1/1717986387840	1/3435972775680	1/6871945551360	1/1374389110240	1/2748778220480	1/5497556440960	1/1099511281920	1/2199022563840	1/4398045127680	1/8796090255360	1/1759218051040	1/3518436102080	1/7036872204160	1/14073744408320	1/28147488816640	1/56294977633280	1/11258995526560	1/22517991053120	1/45035982106640	1/90071964213280	1/18014392846560	1/36028785693120	1/72057571386240	1/14411514273280	1/28823028546560	1/57646057093120	1/115292114186240	1/230584228372480	1/461168456744960	1/922336913489920	1/184467382797920	1/368934765595840	1/737869531191680	1/147573906283360	1/295147812566720	1/590295625133440	1/118059125266880	1/236118250533760	1/472236501067520	1/944473002135040	1/188894600427080	1/377789200854160	1/755578401708320	1/1511156803416640	1/3022313606833280	1/6044627213666560	1/1208925442733320	1/2417850885466640	1/4835701770933280	1/9671403541866560	1/1934280708333280	1/3868561416666560	1/7737122833333280	1/1547424566666640	1/3094849133333280	1/6189698266666640	1/12379396533333280	1/2475879306666640	1/49517586133333280	1/9903517226666640	1/19807034453333280	1/3961406890666640	1/79228137813333280	1/1584562762666640	1/31691255253333280	1/6338251050666640	1/1267652000000000	1/2535304000000000	1/5070608000000000	1/10141216000000000	1/20282432000000000	1/40564864000000000	1/81129728000000000	1/162259456000000000	1/324518912000000000	1/649037824000000000	1/1298075648000000000	1/2596151296000000000	1/5192302592000000000	1/1038460518400000000	1/2076921036800000000	1/4153842073600000000	1/8307684147200000000	1/1661536829440000000	1/3323073658880000000	1/6646147317760000000	1/1329229463520000000	1/2658458927040000000	1/5316917854080000000	1/1063383570816000000	1/2126767141632000000	1/4253534283264000000	1/8507068566528000000	1/1701413713305600000	1/3402827426611200000	1/6805654853222400000	1/1361130970644800000	1/2722261941289600000	1/5444523882579200000	1/1088904775158400000	1/2177809550316800000	1/4355619100633600000	1/8711238201267200000	1/1742247640253440000	1/3484495280506880000	1/6968990561013760000	1/1393798112202720000	1/2787596224405440000	1/5575192448810880000	1/1115038489762160000	1/2230076979524320000	1/4460153959048640000	1/8920307918097200000	1/1784061583619440000	1/3568123167238880000	1/7136246334477760000	1/1427249266895520000	1/2854498533791040000	1/5708997067582080000	1/1141799413516400000	1/2283598827032800000	1/4567197654065600000	1/9134395308131200000	1/1826879061626240000	1/3653758123252480000	1/7307516246504960000	1/1461503249309920000	1/2923006498619840000	1/5846012997239680000	1/1139202594447840000	1/2278405188895680000	1/4556810377791360000	1/9113620755582720000	1/1822724151116560000	1/3645448302233120000	1/7290896604466240000	1/1458179320893280000	1/2916358641786560000	1/5832717283573120000	1/1166543456714640000	1/2333086913429280000	1/4666173826858560000	1/9332347653717120000	1/1866469530743440000	1/3732939061486880000	1/7465878122973760000	1/1493175624594720000	1/2986351249189440000	1/5972702498378880000	1/1194540497675760000	1/2389080995351520000	1/4778161990703040000	1/9556323981406080000	1/1911264796281280000	1/3822529592562560000	1/7645059185125120000	1/1529011837025040000	1/3058023674050080000	1/6116047348100160000	1/12232094696200320000	1/24464189392400640000	1/48928378784801280000	1/97856757569602560000	1/19571351513920512000	1/39142703027841024000	1/78285406055682048000	1/15657081211136416000	1/31314162422272832000	1/62628324844545664000	1/125256649689091328000	1/250513299378182656000	1/501026598756365312000	1/100205319513131064000	1/200410639026262128000	1/400821278052524256000	1/801642556105048512000	1/160328511221009024000	1/320657022442018048000	1/641314044884036096000	1/128262808976807219200	1/256525617953614438400	1/513051235907228876800	1/102610247815445753600	1/205220495630891507200	1/410440991261783014400	1/820881982523566028800	1/164176396544713205600	1/328352793089426411200	1/656705586178852822400	1/131341117237770544800	1/262682234475541089600	1/525364468951091176000	1/105072893790218235200	1/210145787580436470400	1/420291575160872940800	1/840583150321745881600	1/168116630064349176000	1/336233260128698352000	1/672466520257396704000	1/134493304051479340800	1/268986608102958681600	1/537973216205917363200	1/107594643241183472800	1/215189286482366945600	1/430378572964733891200	1/860757145929467782400	1/1721514298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TABLE: MEASURED SOUND PRESSURE LEVEL (DB)
1/3 OCTAVE BAND
2

NOISE SOURCE/SUBJECT:		OPERATION:		LOCATION/CONDITION										
C-12A		IN-FLIGHT CREW NOISE		1/R	2/R	3/R	4/R	S/R	1/S	1/T	1/U	1/W	1/X	1/Y
25	82	78	72	74	81	83	81	82	81	79	80	78	80	82
31.5	83	86	87	84	84	86	82	84	83	82	75	79	81	97
40	84	83	89	86	86	87	76	88	87	85	80	84	84	91
50	88	83	84	87	87	84	87	87	87	87	80	84	85	89
63	89	87	95	87	84	87	84	87	87	87	83	85	86	92
80	85	82	83	84	83	87	98	98	97	98	95	85	83	94
100	97	97	98	101	100	98	101	100	101	90	78	100	93	89
125	95	94	84	86	86	86	85	85	85	83	76	83	84	88
160	86	83	83	84	85	87	85	87	86	89	80	81	86	91
200	99	94	94	90	92	98	92	92	94	79	91	91	91	96
250	87	85	83	82	82	91	91	91	87	80	84	88	88	86
315	93	97	84	84	84	94	94	94	87	85	76	90	97	97
400	93	85	83	82	82	82	89	89	88	84	75	83	86	87
500	88	84	82	82	81	89	86	86	84	75	79	82	83	83
630	86	84	80	80	81	84	82	82	81	74	78	81	81	86
800	84	80	79	79	82	80	79	80	79	71	75	79	80	80
1000	84	79	86	80	79	80	78	78	78	70	74	74	81	81
1250	91	79	80	76	76	78	76	76	76	67	72	72	84	84
1600	84	74	71	69	71	74	72	71	71	63	70	68	68	68
2000	81	68	68	65	68	68	69	69	69	68	60	67	67	75
2500	77	65	63	63	65	66	66	66	65	65	57	63	63	73
3150	66	60	62	61	64	63	62	61	61	60	53	60	61	65
4000	66	59	60	59	62	61	59	59	57	56	50	55	56	63
5000	62	56	58	57	61	60	59	59	57	56	51	54	56	62
6300	60	54	57	57	61	58	57	56	57	56	50	56	56	62
8000	59	54	56	59	63	59	57	57	57	56	50	55	56	62
10000	58	54	56	57	62	57	57	57	57	56	51	54	56	62
OVERALL	103	101	102	101	103	104	101	104	101	91	101	99	99	103

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)
2 OCTAVE BAND

IDENTIFICATION:

NOISE SOURCE/SUBJECT: C-12A
IN-FLIGHT CREW NOISE
OPERATION: TEST BZ-082-001
TEST RUN 01
15 JUL 82
PAGE J1

FREQ (HZ)	LOCATION/CONDITION												
	1/A	1/B	1/C	1/D	1/E	1/F	1/G	1/H	1/I	2/I	3/I	4/I	5/I
31.5	97	99	98	93	89	87	87	86	86	84	91	88	86
63	83	88	95	89	93	92	88	87	87	86	88	88	84
125	83	88	103	102	107	105	100	96	94	95	95	92	96
250	79	88	94	98	102	98	93	98	98	97	93	98	85
500	71	82	92	90	91	91	87	93	93	89	86	83	82
1000	73	71	86	77	85	90	80	84	84	85	83	82	78
2000	69	64	74	72	78	86	72	73	73	70	74	69	69
4000	61	60	65	63	69	70	64	64	65	63	63	62	62
8000	59	58	64	61	65	63	60	62	62	58	59	60	61
OVERALL	97	100	105	104	109	106	101	101	101	100	99	95	98

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)
OCTAVE BAND

MEASURED SOUND PRESSURE LEVEL (DB)										IDENTIFICATION:		
NOISE SOURCE/SUBJECT: C-12A IN-FLIGHT CREW NOISE										OPERATION: TEST BZ-082-001 RUN 02		
LOCATION/CONDITION 1/0 1/P 3/P 1/Q										PAGE J2		
FREE (HZ)	1/3	1/10	1/100	1/N	2/N	3/N	4/N	5/N	1/0	1/P	3/P	1/Q
31.5	65	65	66	64	67	66	69	68	67	67	67	66
63	62	69	94	98	91	94	97	90	96	91	94	102
125	95	91	91	94	97	94	94	97	95	97	96	91
250	96	92	90	97	100	97	92	88	90	100	95	93
500	90	86	84	90	93	90	90	85	94	92	89	85
1000	81	80	79	82	87	86	87	84	80	90	82	86
2000	72	71	70	73	89	84	73	70	69	85	74	74
4000	64	63	63	65	69	65	64	62	63	67	66	64
8000	60	58	58	61	65	62	61	61	63	62	61	61
OVERALL	100	97	97	100	103	100	98	99	97	103	101	104

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)
2 OCTAVE BAND

NOISE SOURCE/SUBJECT:	OPERATION:	1	2	3	4/R	5/R	1/S	1/T	1/U	1/H	1/X	1/Y	LOCATION/CONDITION											
													FREQ (HZ)	1/R	2/R	3/R	4/R	5/R	1/S	1/T	1/U	1/H	1/X	1/Y
C-12A	TEST BZ-082-001	31.5	98	99	91	98	87	87	86	86	81	85	87	101										
IN-FLIGHT CREW NOISE	RUN 03	63	92	95	95	91	97	92	96	96	88	89	91	97										
		125	98	98	98	98	101	100	99	102	93	83	100	94										
		250	100	95	95	91	93	100	95	90	83	94	94	91										
		500	95	89	87	86	96	96	93	91	88	79	85	88										
		1000	88	84	87	83	83	85	83	83	74	74	78	81										
		2000	86	75	73	70	74	75	74	73	65	64	57	64										
		4000	70	63	65	64	67	66	65	64	57	57	55	59										
		8000	64	59	61	62	67	63	62	61	55	55	59	61										
OVERALL		103	101	101	102	101	103	104	101	91	101	99	101	103										

(TABLE: MEASURES OF HUMAN NOISE EXPOSURE

3

NOISE SOURCE/SUBJECT:		OPERATION:		LOCATION/CONDITION		1/4 1/8 1/16 1/32 1/64 1/128 1/256 1/512 1/1024 1/2048 1/4096 1/8192 1/16384 1/32768 1/65536 1/131072 1/262144 1/524288											
C-12A	IN-FLIGHT CREW NOISE					100	101	101	101	101	101	101	101	101	101	101	
						96	96	96	96	96	96	96	96	96	96	96	96
						92	92	92	92	92	92	92	92	92	92	92	92
						88	88	88	88	88	88	88	88	88	88	88	88
						84	84	84	84	84	84	84	84	84	84	84	84
						80	80	80	80	80	80	80	80	80	80	80	80
						76	76	76	76	76	76	76	76	76	76	76	76
						72	72	72	72	72	72	72	72	72	72	72	72
						68	68	68	68	68	68	68	68	68	68	68	68
						64	64	64	64	64	64	64	64	64	64	64	64
						60	60	60	60	60	60	60	60	60	60	60	60
						56	56	56	56	56	56	56	56	56	56	56	56
						52	52	52	52	52	52	52	52	52	52	52	52
						48	48	48	48	48	48	48	48	48	48	48	48
						44	44	44	44	44	44	44	44	44	44	44	44
						40	40	40	40	40	40	40	40	40	40	40	40
						36	36	36	36	36	36	36	36	36	36	36	36
						32	32	32	32	32	32	32	32	32	32	32	32
						28	28	28	28	28	28	28	28	28	28	28	28
						24	24	24	24	24	24	24	24	24	24	24	24
						20	20	20	20	20	20	20	20	20	20	20	20
						16	16	16	16	16	16	16	16	16	16	16	16
						12	12	12	12	12	12	12	12	12	12	12	12
						8	8	8	8	8	8	8	8	8	8	8	8
						4	4	4	4	4	4	4	4	4	4	4	4
						0	0	0	0	0	0	0	0	0	0	0	0

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: MEASURES OF HUMAN NOISE EXPOSURE

3

NOISE SOURCE/SUBJECT:	OPERATION:
C-12A	
IN-FLIGHT CREW NOISE	

HAZARD/PROTECTION C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)									
NO PROTECTION	1/3	1/8	1/L	1/M	1/N	2/N	3/N	4/N	5/N
OASLC	99	96	97	100	103	100	98	98	97
OASLA	90	87	86	91	95	93	91	88	86
T	170	285	339	143	71	101	143	240	339
H-197 IN-FLIGHT COMMUNICATION UNIT									
OASLC	79	76	76	79	82	79	76	75	82
T	960	960	960	960	679	960	960	960	679
U-51R EAR PLUGS									
OASLC	69	66	65	70	73	70	68	66	64
T	960	960	960	960	960	960	960	960	960
MINIMUM SPL EAR MUFFS									
OASLC	77	73	74	77	80	77	75	76	75
T	960	960	960	960	960	960	960	960	960

COMMUNICATION PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)									
PSIL	81	79	78	82	90	87	83	80	78

ANNOYANCE	PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDL)	TONE CORRECTION (C IN DB)	PNLT	106	101	106	111	108	104	104	102	110	105	106	103

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: MEASURES OF HUMAN NOISE EXPOSURE

3

NOISE SOURCE/SUBJECT:	OPERATION:										LOCATION/CONDITION	MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)										
	1/R	2/R	3/R	4/R	S/R	1/S	1/T	1/U	1/U	1/W		1/R	2/R	3/R	4/R	S/R	1/S	1/T	1/U	1/U	1/W	1/X
HAZARD/PROTECTION																						
OASBLC	100	101	102	101	103	104	101	90	101	98	102	90	89	89	89	89	89	89	89	89	89	89
OASBLA	95	90	89	89	94	91	89	80	89	80	89	80	80	80	80	80	80	80	80	80	80	80
T	71	120	143	202	202	143	202	96	202	96	202	202	202	202	202	202	202	202	202	202	202	202
H-157 IN-FLIGHT COMMUNICATION UNIT																						
OASBLA	83	79	79	80	80	82	82	79	80	80	80	80	80	80	80	80	80	80	80	80	80	80
T	571	960	960	960	960	679	679	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960
U-51R EAR PLUGS																						
OASBLA	73	69	69	67	67	73	73	70	68	59	68	68	68	68	68	68	68	68	68	68	68	68
T	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960
MINIMUM SPL FOR MURFS																						
OASBLA	81	78	79	80	79	81	82	79	67	80	76	76	76	76	76	76	76	76	76	76	76	76
T	807	960	960	960	960	807	807	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION																						
PAIL	90	83	83	80	80	84	84	83	81	73	79	80	86	86	86	86	86	86	86	86	86	86
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNL)																						
TONE CORRECTION (C IN DB)																						
PNL/T	111	106	107	106	107	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106
C	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.